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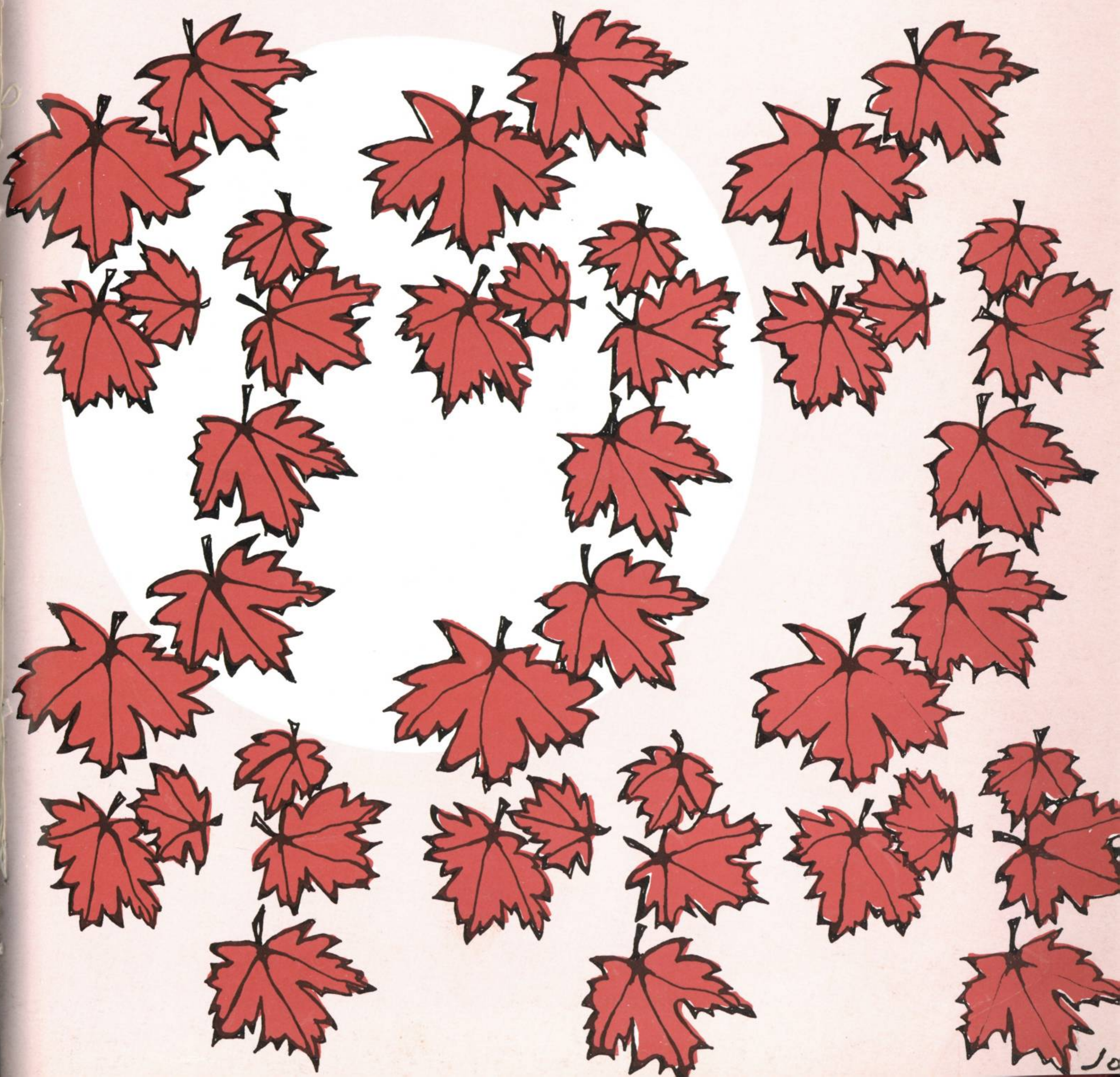

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Cover illustration by Jo Ellen McElwee

Editor's Notes

Rendering Unto Caesar

"The problem is to find a form of association which will defend and protect with the whole common force the person and goods of each associate, and in which each, while uniting himself with all, may still obey himself alone, and remain as free as before." This is the fundamental problem of which the Social Contract provides the solution.

Thus Jean Jacques Rousseau in 1762 identified that necessary, although sometime unpalatable, alliance that the citizenry must observe in the interest of individual survival. Like it or not, one cannot live alone. In return for benefits of the social scheme the citizen has to abide by certain laws, yield some independence, and pay taxes.

The uneasy contract goes way back. The Old Testament (II Kings 23:35) recounts that "He (King Jehoiakim) exacted the silver and the gold of the people of the land, everyone according to his taxation, to give it unto Pharaoh-necoh."

Early tax collection was confiscatory and harsh with no regard for social consequences. Sophistications of stimulation, or contraction, of the economy by means of tax leverage were centuries away. So were tax loopholes and concepts of earned and unearned income, tax shelters, accelerated depreciation, tax deferrals and all the array of computations that keeps the accounting profession so gainfully employed. The common factor that persists through the ages is hatred of the tax and tax-collector.

Now that the Economic Recovery Tax Act of 1981 is evoking visions of a few wispy sugar plum fairies for a tax-weary nation it is entertaining to review some of the early feints and strategems during the classic conflict between taxpayers and tax-collectors.

The traveler along the Loire Valley in France sees doorways and windows flush with the rising river-bank, but with no other structural parts in view. One assumes the obvious: they are dug out caves for storing wine flowing from the abundant grape harvest in the countryside. And storages they are, but these cavelike entries survive from a much earlier day when the wily farmers avoided a French tax levied on square footage of roof by simply having no roof to their dwellings other than the land atop the valley enbankment. Those Loire wine growers had a literal tax shelter.

Land was the basis of taxation in medieval Europe but titled nobles, as fighters for the protection of the king, were exempt, as were the officials because they were so poorly paid, and as also were the clergy since they defended the kingdom's spiritual welfare. The noble, however, was expected to provide a small garrison of knights for internal defense, meanwhile collecting taxes of goods and services from the vassals who worked his land in exchange for safe occupancy. Default of fealty meant that a serf was turned out to starve, while a defaulting noble lost support of the monarch and his lands became fair prey for covetous neighboring dukes who comprised the rest of the king's heirarchy. A rigorous social contract; small wonder that intrigue and treachery were popular forms of tax/service evasion.

The Church held the keys to the kingdom of heaven and besides that was, in effect, the State fully as much as the king, so its fund raising had all the marks of taxation. A cut was taken from altar collections, dues were collected from papal fiefdoms, and fees were charged for all rites of passage as well as for pardons from sin. Grace could be had for a price. Papal tax collectors, no worse than any of their contemporaries, were much more hated because of their claim to reverence. In fact, their acquisitivness gave rise to one of the great social changes because ecclesiastical greed hastened the Reformation.

Even Fr. Pacioli, priestly patriarch of accounting, played an ambivalent game when it came to taxes. He piously admonished that truth should always be a businessman's guide, but wrote "Make the prices (costs) high rather than low. If it seems to you that something is worth 20, put it down at 24 . . ." His elevation of the cost of goods sold to decrease taxes on profits would have made him a modern day supporter of LIFO.

Almost three hundred years later, American colonists ripped open 342 chests of tea from three English ships and threw them into Boston harbor, rather than pay taxes on the tea, thus performing one of history's ultimates in tax avoidance.

In 1981 the Reagan administration has enacted one of the most significant tax cuts in recent history. The move acknowledges a fact well known to economists: when taxes become onerous they produce less revenue, not more, because they retard the economy. Continuous escalation of taxes over four decades since World War II appeared to be killing the goose that laid the golden eggs. Whether or not a revival will ensue now, and the flow of golden eggs renew itself, only time can tell. What can be predicted with assurance is that as long as tax laws change, and change, and change again, there will be full employment for accountants. Ω

Constance T. Barcelona

Government Access To Documents And Testimony In Federal Tax Cases

Accountants As "Third-party" Record Keepers

By Susan M. Saterfiel

As an incident to accountants' representation of taxpayers in Internal Revenue Service (IRS) examinations, it is necessary to be familiar with IRS access to books, records, working papers, and testimony. The accountant also should be able to recognize the earmarks of a criminal investigation so as to refer the client to an attorney when appropriate.

The IRS can use its summons power under IRC §7602 to gain access to books, records, and working papers regardless of possession by taxpayers, accountants, or other third parties. The summons can also be used to require testimony. Where specific legal requirements are met, the IRS can use search warrants to search and seize tax records and working papers. After criminal cases are referred to the Department of Justice, federal grand juries can use their subpoena power to require production of documents and testimony.

The Summons

The IRS obtains its power from §7602 of the Internal Revenue Code (IRC) to examine data, to summon either the taxpayer or a third party, and to take relevant testimony for the purpose of ascertaining the correctness of any return, making a return where none has been made, or determining the tax liability of any person.[1] IRS agents routinely carry summonses with them and sign and serve them when it is deemed necessary. The only requirements for the summons are that its purpose is for the determination of tax liability and that the data desired must be relevant to this purpose. In *United States v. Powell*,[2] the "fourfold test" for a valid summons was established: (1) the investigation must be conducted for a legitimate purpose; (2) the inquiry should be relevant to this purpose; (3) the desired material must not be possessed by the IRS; and (4) the administrative steps required by the IRC must have been followed. The IRS does not have the power to enforce a valid summons but must seek an attachment against the summoned party from a court.

Notice Requirements

The 1976 Tax Reform Act added IRC §7609[3] which provides for special procedures in the case of third-party summonses. In general, if any summons is served on a third-party record keeper and such summons requires the production of records of any person other than that summoned, then notice of the summons must be given to the person whose transactions are described in the records within three days of the date of service. For the purposes of IRC §7609, the term "third-party record keepers" is: (1) any mutual savings bank or other savings institution chartered and supervised under Federal or State law, any bank, or any credit union; (2) any consumer reporting agency; (3) any person extending credit through the use of credit cards or similar devices; (4) any attorney; and (5) any accountant. There are several illustrative cases involving the definition of the third-party record keeper.

The *United States v. Exxon*[4] case involved a summons to Exxon for documents dealing with land being leased from the taxpayer by Exxon. The taxpayer tried to intervene by claiming that Exxon is a third-party record keeper since it extends credit through credit cards. The United States District Court ruled that since the records summoned were unrelated to credit activities, Exxon is not a third-party record keeper for this situation.

United States V. Desert Palace, Inc.[5] provides another viewpoint. The IRS ordered the Desert Palace through a summons to turn over all records of transactions for a particular taxpayer. No notice was given to the taxpayer, but upon learning of the summons, the taxpayer demanded that the Desert Palace not comply. The taxpayer argued that the Desert Palace was a third-party record keeper and that the summons was not enforceable since the taxpayer was not given notice. The IRS said that the Desert Palace was not a third-party record keeper; however, the United States District Court ruled that the Desert Palace was, in fact, a third-party record keeper due to its extending credit to customers. The summons was not upheld since formal notice was not given to the taxpayer.

To further clarify the definition of third-party record keeper, consider the *United States v. White Agency*[6] case. In this case, the taxpayer was seeking to intervene in connection with the summons of employment and compensation records of the taxpayer. It was determined by the IRS that the White Agency was not a third-party record keeper; therefore, no notice to the taxpayer was necessary. The taxpayer argued that the agency was a broker which is a third-party record keeper under §7609 (a) (3) of the IRC. However, the court ruled that the summons was directed at the property of the White Agency. The taxpayer had no significant protectable interest in such property. Since the agency was not acting in its role as broker, it was not a third-party record keeper. The court ordered compliance with the summons. In the 1978 case, *United States v. J. Joseph Gartland, Inc.*,[7] it was ruled that a corporation is not a third-party record keeper as defined in §7609.

Section 7609 does not apply to summons if: (1) it is solely to determine the identify of any person having a numbered account with a bank or other institution; or (2) it is in aid of the collection of the liability of any person against whom an assessment has been made or judgment rendered. A case illustrating this situation is *United States v. Commonwealth National Bank*.[8] This case involved a taxpayer who argued that a summons had been given to a third-party record keeper and he had not been given notice in accordance with §7609 of the IRC. However, the court ruled that since the summons was issued to aid in the collection of a tax liability from a person against whom a judgment has been made, the rule concerning notice of the taxpayer does not apply.

Right to Intervene

Section 7609 further grants any person who is entitled to notice of a summons the right to intervene in the enforcement of such summons and the right to stay compliance if written notice not to comply is given to the person summoned and to the IRS within 14 days. The IRS will then be prevented from examination of the summoned documents until a court order for enforcement is obtained.

The John Doe Summons

Another provision of IRC §7609 is the use of the John Doe summons. A John Doe summons is any summons which does not identify the person with respect to whose liability the summons is issued. In *United States v. Bisceglia*,[9] the United States Supreme Court ruled that the IRS has the authority to issue a John Doe summons to a bank or other depository to discover the identity of a person who has had bank transactions suggesting the possibility of liability for unpaid taxes. The failure to have a name on the summons does not make it unenforceable. To determine the tax liability of a taxpayer, the IRS requested names and addresses from the telephone company of three of the telephone numbers appearing on a taxpayer's telephone bill in the 1979 case *United States v. South Central Bell Telephone Company*.[10] The Telephone Company claimed that there had been no notice made to the three subscribers before the delivery of notice to the third-party. In ruling, the United States District Court held that a John Doe summons does not apply if the subscribers are not being investigated as to their tax liability.

Handwriting Exemplars

One question involving the scope of the IRS summons is the use of the summons to produce handwriting samples. There have been conflicting rulings over whether §7602 of the IRC permits the IRS to require a taxpayer to create a document by giving handwriting exemplars.

In *United States v. Campbell*,[11] the Eighth Circuit Court rules that handwriting exemplars are not testimonial but are a physical characteristic of the person. The Court ruled that §7602 of the IRC of 1954 gives the IRS the authority to summon handwriting exemplars and ordered the summons enforced. In *United States v. Rosinsky*,[12] the Fourth Circuit Court ruled that since under a grand jury subpoena a witness may be compelled to give handwriting exemplars and since the IRS power to summon is essentially the same as the grand jury's, a summons to require handwriting exemplars is valid. However, in the United States District Court cases of *United States v. Del Sandro*[13] and *United States v. Lewis*,[14] the IRS was found not to have the power to compel handwriting exemplars.

The conflict in the rulings was resolved by the United States Supreme Court in *United States v. Euge*.[15] It was held that Congress has empowered the IRS to compel handwriting exemplars under the summons authority of §7602. The decision was based upon the fact that the duty to appear and give

> At initial confrontation the accountant should inquire if a special agent is involved.

testimony in §7602 has traditionally included a duty to provide some form of nontestimonial, physical evidence, such as handwriting.

Summons Directed to Taxpayer's Accountant

The accountant should recognize that IRS revenue agents are charged with civil enforcement and that IRS special agents are charged with criminal enforcement. Normally the accountant cooperates with the IRS and turns over books, records, and working papers after obtaining client approval. If a special agent appears, however, the accountant should advise the client to seek legal counsel. It is important, therefore, for the accountant to inquire if there is a special agent involved when initially confronted by the IRS. In the *United States v. Tweel*,[16] the accountant was told that there was not a special agent on the case. However, the audit was made at the request of the Organized Crime and Racketeering Section of the Department of Justice. The conviction was reversed due to an unreasonable search under the Fourth Amendment.

In the *Couch v. United States*[17] case, the accountant was in possession of the taxpayer's bank statements, payroll records, and sales and expenditure reports. Where the accountant had the taxpayer's consent, a revenue agent was allowed to begin an examination of the records. Upon the revenue agent's findings, a special agent was called in to participate in the investigation. The taxpayer withdrew the permission previously granted, and the special agent issued a summons to the accountant. The Fifth Amendment right and the accountant-client privilege were claimed by the taxpayer as grounds for nonenforcement of the summons. The Supreme Court ruled that the Fifth Amendment is not

Fifth Amendment defense for the taxpayer has never been fully explored.

available to the taxpayer when the summons is given to the accountant and that state accountant-client privilege statutes are unavailable in federal tax investigations.

Summons Directed to Taxpayer's Attorney

The leading case involving a summons to the taxpayer's attorney is *Fisher v. United States.*[18] The taxpayer was being investigated for possible civil or criminal liability under federal income tax laws. After obtaining certain relevant documents from the accountant, the taxpayer transferred the documents to the attorney. The IRS issued a summons to the attorney who refused to surrender the documents on the grounds of the Fifth Amendment and the attorney-client privilege. The summons was ordered enforced.

In the 1976 *United States v. Heiberger*[19] case, the taxpayer's lawyer was also an accountant. The taxpayer resisted the summons for the working papers on the tax return since the return was prepared by the lawyer and thus privileged. However, the court ruled that as far as this case was concerned, the taxpayer had consulted the lawyer in the role of accountant. Therefore, attorney-client privilege was not relevant for the summons.

Taxpayer in Possession

The question as to whether a taxpayer in possession can use the Fifth Amendment as a defense to noncompliance with the summons has not been fully explored. In *United States v. Beattie,*[20] the taxpayer was summoned to appear and bring all of the working papers prepared by the CPA which were used in the preparation of the individual tax return. These documents requested included but were not limited to trial balances, balance sheet, adjusting and closing entries, working papers, notes, memoranda, and any correspondence used in the preparation of the return. The Circuit Court held that production of copies of letters sent by the accountant to the taxpayer would not violate the taxpayer's privilege against self-incrimination. However, the Court held that production of letters sent by the taxpayer to the accountant and retrieved from the accountant by the taxpayer in anticipation of a criminal tax investigation would violate the taxpayer's Fifth Amendment rights. The Court ruled that the Fifth Amendment protects against compulsory production of papers written by an accused with respect to one's own affairs and presently in one's own possession whether or not previously sent to another for the latter's retention.

In *United States v. Knight,*[21] the taxpayer had possession of accountant's working papers and asserted the self-incrimination defense. The District Court ruled that accountants' role in creating documents place them outside any Fifth Amendment privilege. The taxpayer's possession of the papers does not bring them within the privilege.

Defenses to the Summons

Illegal Purpose. The *United States v. LaSalle National Bank*[22] case established two nonexclusive requirements for enforcement of an IRS summons: (1) summons must be issued before the IRS recommends to the Department of Justice that a criminal prosecution be undertaken; and (2) summons authority must be used in good-faith pursuit of the congressionally authorized purposes of §7602. Further, this case pointed out that before recommendation to the Department of Justice, tax fraud cases are both civil and criminal. Therefore, the intent of the agent cannot be the measuring stick. The question as to whether an investigation has solely criminal purposes can be answered only by an examination of the "institutional posture" of the IRS. Those opposing enforcement must bear the burden of disproving the actual existence of a valid civil tax determination or collection purpose by the IRS. In the 1979 case *United States v. Chemical Bank,*[23] the taxpayer said that the summons was issued to the Chemical Bank solely for a criminal investigation. The claim was made due to the fact that the return was being examined as an independent audit within the Brooklyn District Internal Revenue Service Strike Force Program which is coordinated by the Department of Justice. The Strike Force designates the subject to be audited by the IRS; thereafter, the IRS is autonomous. The Second Circuit Court ruled that there was no indication that the civil liability search had ended; therefore, the enforcement of the summons was ordered. Holding up of a criminal indictment against a taxpayer in order for the IRS to gather information for the FBI was ruled in *United States v. Chase Manhattan Bank*[24] to be grounds for nonenforcement of a summons.

Relevancy. The IRS must show relevancy between the summons and the legitimate purpose for the investigation. In the *United States v. Coopers and Lybrand*[25] case, the tax return of the corporate taxpayer was prepared by accounting personnel within the corporation. However, the IRS issued summonses to Coopers and Lybrand for tax accrual files prepared by the taxpayer and for the CPA firm's audit program used in the audit of the taxpayer. The Tenth Circuit Court held the summonses as unenforceable on the grounds of irrelevancy and immateriality to the determination of the tax liability of the taxpayer. Further, the case brought out that if the IRS fails to show that material is relevant to the purpose of the investigation, then the summons is overbroad and unreasonable under the Fourth Amendment. The case of *United States v. Matras*[26] denied enforcement to an IRS summons for a taxpayer's budgets. The IRS had requested the documents to provide them with a "road map" for the investigation. The Eighth Circuit Court ruled that the IRS failed to prove the relevancy of the budgets and that the issue of whether budgets are potentially relevant to an investigation must be determined on an ad hoc basis. Finally, the term "relevance" was defined to mean more than "convenience." The Supreme Court upheld the Bank Secrecy Act of 1970 in *California Bankers Association v. Schultz.*[27] This act requires financial institutions to maintain records of the identities of customers and to maintain microfilm copies of customer transactions for use in criminal, tax, or regulatory investigations. Title II of the Bank Secrecy Act requires reports of transfer of more than $5,000 into or outside of the United States and of domestic deposits or withdrawals in excess of $10,000.

The Search Warrant

The utilization of the search warrant is restricted by the Fourth Amendment requirements of probable cause. The Fourth Amendment requires that: (1) a search warrant must be obtained from a neutral and detached magistrate; (2) evidence must establish probable cause that a crime has been committed; (3) the warrant must describe the place to be searched and items to be seized; and (4) there must be a connection between the item to be seized and the crime alleged.

In *Andreson v. Maryland,*[28] a sole practitioner attorney was under fraud investigation. Investigators received search warrants to search the law office to obtain evidence. Although the bottom of the search warrant contained the phrase "together with other fruits, instrumentalities and evidence of crime at this time unknown," the warrant was not found to be an illegal general warrant, because the phrase was referring to a particular real estate lot.

The Fourth Amendment protection of corporations was shown by the *G.M. Leasing v. United States*[29] case. The warrantless entry and seizure of books and records was in violation of the Fourth Amendment. However, the seizure of automobiles in public places for collection of taxes was ruled as not invading privacy and therefore, such seizure required no search warrant.

The Grand Jury Subpoena

The grand jury deliberates in secret and is given a wide range of authority to determine if a criminal crime has been committed. There need be no showing of probable cause and there need be no notice given to the taxpayer that he is being examined. Therefore, it is a more powerful discovery tool than the summons. The taxpayer's right to refuse to answer irrelevant questions is limited and by a grant of immunity the taxpayer's testimony may be compelled.

In *General Motors v. United States,*[30] the Circuit Court ruled that grand jury subpoenas are not final decisions for purposes of appeal. Thus, the Interlocutory Appeals Act of 1958 which provides appeal rights from interim or non-final decisions applies to civil and not to criminal cases.

Summary And Conclusion

The accountant in tax practice is often caught between IRS demands and the client's desire to resist. Therefore, it is important to be familiar with vital aspects of government procedures relating to production of documents.

One method of access is through the IRS summons. The IRS is bound by the *United States v. Powell* "four-fold test" of good faith and by the *United States v. LaSalle* rule limiting use of summons after the decision to prosecute. Further, the IRS must show relevancy between the summons and the purpose of the investigation.

When the accountant is in possession of the requested documents, the Fifth Amendment is not available as a defense against production, and no accountant-client privilege is recognized. When the attorney is in possession, papers do not achieve a greater protection than they would have in the taxpayer's possession. The Fifth Amendment may be used by the taxpayer when the "private papers" of the taxpayer are involved.

A search warrant is limited by Fourth Amendment conditions of probable cause and is available both to individuals and to corporations. The grand jury subpoena need not show probable cause nor give notice. As such, it is the most powerful means of access available.

Accountants should keep abreast of changes in government access in order to guide the client through any civil IRS review process and to refer the client to counsel at the appropriate point.Ω

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FOOTNOTES

[1]IRC of 1954 Section 7602.

[2]United States v. Powell, 379 U.S. 48 (1964).

[3]IRC Section 7609.

[4]United States v. Exxon Co., 78-2 USTC ¶9531 (D. Md. 1978).

[5]United States v. Desert Palace, Inc., 79-1 USTC ¶9296 (D. Nevada 1979).

[6]United States v. White Agency, 79-1 USTC ¶9265 (W.D. Mich. 1979).

[7]United States v. J. Joseph Gartland, Inc., 78-2 USTC ¶9604 (D. Md. 1978).

[8]United States v. Commonwealth National Bank, 79-2 USTC ¶9570.

[9]United States v. Bisceglia, 420 U.S. 141, 146 (1974).

[10]United States v. South Central Bell Telephone Co., 79-1 USTC ¶9291 (M.D. Tenn. 1979).

[11]United States v. Campbell, 524 F.2d 604 (8th Cir. 1975).

[12]United States v. Rosinsky, 547 F.2d 249 (4th Cir. 1977).

[13]United States v. Del Sandro, 79-1 USTC ¶9242 (W.D. PA. 1979).

[14]United States v. Lewis, 78-2 USTC ¶9659 (N.D. Tex. 1978).

[15]United States v. Euge, 48 U.S. L.W. 4184 (Feb. 19, 1980).

[16]United States v. Tweel, 550 F.2d 297 (5th Cir. 1977).

[17]Couch v. United States, 409 U.S. 322 (1973).

[18]Fisher v. United States, 425 U.S. 391 (1976).

[19]United States v. Heiberger, 76-1 USTC ¶9366 (D. Conn. 1976).

[20]United States v. Beattie, 541 F.2d 329 (2nd Cir. 1976).

[21]United States v. Knight, 78-1 USTC ¶9303 (D. Conn. 1978).

[22]United States v. LaSalle National Bank, 437 U.S. 298 (1978).

[23]United States v. Chemical Bank, 593 F.2d 451 (2nd Cir. 1979).

[24]United States v. Chase Manhattan Bank, 598 F.2d 321 (2nd Cir. 1979).

[25]United States v. Coopers and Lybrand, 550 F.2d 615 (10th Cir. 1977).

[26]United States v. Matras, 487 F.2d 1271 (8th Cir. 1973).

[27]California Bankers Association v. Schultz, 416 U.S. 21 (1974).

[28]Andreson v. State of Maryland, 427 U.S. 463 (1976).

[29]G.M. Leasing Corp. v. United States, 429 U.S. 338 (1977).

[30]General Motors Corp. v. United States, 573 F.2d 936 (6th Cir. 1978).

A Decision Theoretic Approach To Analytical Review

Bayes' Theorem Applied To Audit Regression Analysis

By Myrtle Clark

The third AICPA standard of field work requires the auditor to obtain sufficient competent evidential matter to afford a reasonable basis on which to express an opinion regarding the fair presentation of a client's financial statements. To comply with the standard, the CPA employs two classes of evidence gathering procedures, "compliance tests" and "substantive tests." Substantive procedures comprise (1) tests of details of transactions and balances and (2) analytical review of significant ratios and trends and resulting investigation of unusual fluctuations and questionable items. Tests of details involve examining the individual transactions that result in reported financial statement balances, while analytical review procedures provide evidence regarding the reasonableness of those balances.

This paper focuses on analytical review procedures, specifically the application of regression techniques. Classical regression has been advocated as an appropriate tool for quantifying the reliability of substantive tests (Stringer, 1975 and Kinney, 1979). When using this tool, the auditor must make assumptions about the behavior of an interrelationships among the various elements under analytical review. There must be decisions as to which data are more readily analyzed with the regression technique, what other variables to include in the analysis, and the most appropriate model formulation to apply.

Regression Analysis in Auditing

Audit applications of regression analysis may be either time series studies or cross-sectional examinations of interrelated items. Time series forecasts of particular times of audit interest may be compared to reported book figures in an effort to discern possible occurrences of unanticipated events. Historical data that are functionally related may be analyzed to provide additional corroborative evidence. Relationships must be between physical data and reported book balances, between interrelated accounts, or between historical book figures and external economic data including industry statistics and general economic indicators.

Although regression analysis provides comparative substantive evidence which may highlight areas that require the auditor's attention, the classical approach does not conveniently incorporate prior knowledge regarding the parameters of the regression model assumed. On the other hand, the Bayesian, or decision theoretic, approach explicitly integrates this kind of information into the analysis by providing a mechanism which enables the user to mathematically combine nonsampling information with statistical sampling results. In essence, the Bayesian approach would allow the auditor to make fuller use of the information.

While Bayesian regression has been advocated by writers in other disciplines, the application of Bayes' theorem to auditing regression analysis has not been formally addressed. Nevertheless, a number of authors in the accounting literature have proposed applying Bayesian statistics to various auditing situations. (See for example, Knoblett, 1970; Kaplan, 1973; and Scott, 1973). In general, these authors have limited their discussions to decision theoretic approaches for point estimation procedures such as attributes sampling and variables sampling. They have failed to point out the potential usefulness of the Bayesian Regression technique for the analytical review phase of the audit.

In this paper, the decision theoretic approach is proposed as a logical extension to regression applications in auditing. Regression results appropriately utilizing prior knowledge about the behavior of the variables under examination should both refine and improve the analytical review inputs to the auditor's decision making process. As such, the utility of regression as an auditing tool may be greatly enhanced by incorporating a decision theoretic approach.

When applying this or any other auditing tool, the auditor is aware that the results of auditing decisions may impact the readers of published financial statements. The various evidence gathering procedures are selected and used in an effort to provide a reasonable basis in which to make those decisions. Before presenting a detailed discussion of classical and Bayesian regression, the framework, or model, in which these two approaches are employed should be described.

The Auditing Model

As a practical matter, the auditor functions within the guidelines prescribed by the AICPA Statements on Auditing Standards. Accordingly, there is some risk that material errors in the accounting records will not be detected during the course of the audit examination. Evidence gathered by analytical review techniques is used to pinpoint apparent discrepancies between expectations and reported account balances and thereby aids in the discovery of possible material errors. The statistical technique of regression analysis should provide a rational objective basis for making the required comparisons. A description of an auditing model which incorporates regression as an integral part of analytical review is described below.

Begin by assuming that the auditor has obtained a sufficient number of observations of historical data from the records of the company being audited and from outside sources where appropriate. Moreover, assume that the regression model employed provides a reasonable description of the relationship between the variables under examination. For simplicity of exposition, only the basic linear regression model is discussed here; however, the methodology may be extended to more complex regression models.

When applying the regression technique, the auditor samples n observations for the set of k variables (the dependent variable and k-1 independent variables) from the population of available historical data.

The basic linear model is

$$Y = XB + E \qquad (1)$$

where, Y = a nxl vector of observations on the dependent variable

X = an nxk matrix of observations on the independent variable

B = a kxl vector of regression coefficients

E = a nxl vector of error terms.

The usual assumptions are that the error terms are normally and independently distributed with a mean of zero and a constant variance, σ^2.

The statistical problem is to estimate the true value Y from the available historical evidence, given the assumed regression model. The auditor must decide whether the economic data presented in the client's financial records is substantially different from the values projected by the regression model. For example, the dollar value of sales returns and allowances should vary directly with sales; therefore, regressing sales returns and allowances on sales should provide an indication of what the true value of the reported amount should be in relation to the current sales level. If there is an apparent material difference between the regression estimate and the book value, then the auditor should investigate to determine the cause of the discrepancy.

In other words, the auditor has a set of current book values provided by the client's record keeping system. For each item to be subjected to analytical review, the auditor needs an estimated true value. If applied properly, regression should provide a reasonable approximation of the true value.

The auditor compares the regression estimate with the client's book figures. If a discrepancy exists, it must then be decided whether an investigation is warranted. When making this decision, the auditor is cognizant of the potential impact that materially incorrect reported financial statement numbers may have of users. The actual difference between the true value and the reported book value represents an amalgamation of possible utility losses to individual financial statement readers. These losses are manifested as misallocations of resources among competing investment opportunities, the more material the difference, the greater the potential impact on the investor.

Since auditing decisions ultimately determine what is reported to investors, the auditor's decision to investigate is affected by his/her perceptions regarding user utility losses. Therefore there must be consideration not only of the apparent difference between the information given by the client and the regression estimates, but also the possible difference between the evidence at hand and the true correct values. The better the estimating tools, the more confident the auditor can be that decisions will have a minimal effect on user loss functions.

The Classical Approach to Regression Analysis

Stringer states that "The underlying rationale of analytical review is that conformity of amounts reasonably expected on the basis of past experience and other known conditions provides useful evidential matter for auditing purposes."[1] In his paper, Stringer proposes that classical statistical regression analysis provides this kind of evidence in an objective rational way. Accordingly, solving the normal equations yields the regression coefficient estimates as follows

$$B = (X^tX)^{-1}X^tY \qquad (2)$$

and the population covariance matrix is given by

$$V = s^2(X^tX)^{-1} \qquad (3)$$

where s^2 is the sample estimate of ^{2} and is computed according to

$$s^2 = \left(\frac{1}{n-k}\right)E^tE \qquad (4)$$

where E is the matrix of error terms, or deviations of actual observations from regression model estimates.

The classical approach to regression presupposes that all relevant information (both past and present) has been included in the estimation procedure. In effect, all relevant information resides in the data itself and the auditor need only determine the most appropriate model formulation to describe it. The classical regression output is assumed to yield the best estimate of the item's true value and therefore provide the best evidence on which to base analytical review decisions. Advocates of this approach assume that any extraneous information present when the analysis is performed but not included in the estimation procedure is unimportant.

The Bayesian Approach to Regression Analysis

Conversely, the Bayesian approach allows the auditor to make efficient use of available extraneous information regarding the coefficients in the regression equation. The resulting estimate should therefore be a closer approximation to the true value than that provided by the classical approach. By narrowing the difference between the estimated value and the true value the auditor should have a better basis on which to make his decision regarding any apparent discrepancy between the regression estimate and the client's book figure for the item of audit interest.

Extraneous information which may be incorporated under the

Bayesian, or decision theoretic, approach may be either statistical or *a priori* in nature. Knowledge of the statistical type may come from previous or concurrent statistical investigation. That is, sampling results obtained in a preceding audit engagement constitute prior statistical information. Utilizing the Bayesian regression technique, the prior sampling evidence can be coupled with data gathered in the current audit. The resulting coefficient estimates are therefore based on the two combined sets of information.

Knowledge of the *a priori* type usually arises from general theoretical considerations. Information regarding the sign of the coefficient or even the range within which the coefficient should lie are examples of *a priori* information. To illustrate, the auditor knows that purchase discounts should increase when total purchases increases. Thus if there is a regression of purchase discounts on purchases, one would expect to obtain a positive slope. By the use of Bayes' theorem, the auditor can explicitly incorporate this kind of *a priori* knowledge into the analysis. Estimation procedures which incorporate both statistical and *a priori* types of extraneous information are described and illustrated below.

Estimation Procedures using Prior Statistical Information

Assume that we have data from two samples, (Y_1, X_1, n_1) and (Y_2, X_2, n_2), the first representing prior data, the second representing data collected for the most recent audit examination. The particular estimation procedure employed depends upon whether we consider the two population variances, σ_1^2 and σ_2^2, known or unknown and equal or unequal. In this paper, the variances are assumed known.

If the population variances are equal, the Bayesian model is equivalent to classical pooling. That is, the two samples are combined and parameters are computed using the aggregated data set. In this case, the vector of posterior regression coefficients is estimated by

$$B' = (X_1{}^tX_1 + X_2{}^tX_2)^{-1}((X_1{}^tX_1)B_1 + (X_2{}^tX_2)B_2) \qquad (5)$$

where, B_1 = the vector of coefficients estimated from the first data set
B_2 = the vector of coefficients estimated form the second data set.

Both B_1 and B_2 are computed in accordance with equation (2) above.

Note that B' is nothing more than the weighted average of B_1 and B_2. The weights are the moment matrices, $X_1{}^tX_1$ and $X_2{}^tX_2$. An alternate formulation for B' is (6)

$$B' = (X_1{}^tX_1 + X_2{}^tX_2)^{-1}(X_1{}^tY_1 + X_2{}^tY_2)$$

The posterior covariance matrix is given by

$$V'^2 = s'^2(X_1{}^tX_1 + X_2{}^tX_2)^{-1} \qquad (7)$$

where, s'^2 = the posterior variance which is computed according to

$$s'^2 = \frac{(n_1 - k_1)s_1^2 + (n_2 - k_2)\,s_2^2}{(n_1 - k_1) + (n_2 - k_2)} \qquad (8)$$

and s_1^2 and s_2^2 are the sample variances as determined by equation (4) for each of the respective data sets.

In most applications of Bayesian regression analysis, it is more realistic to assume that the two population variances are not equal. For this case, Zellner and Tiao (1964) show how the vector of regression coefficients would be derived. Their formulation for parameter estimation is

$$B' = (A_1 + A_2)^{-1}(A_1B_1 + A_2B_2) \qquad (9)$$

where,

$$A_1 = \frac{1}{s_1^2}(X_1{}^tX_1) \qquad (10)$$

$$A_2 = \frac{1}{s_2^2}(X_2{}^tX_2) \qquad (11)$$

and A_1 and A_2 are called the precision matrices for the two populations.

In the unequal variances case, B_1 and B_2 are weighted by the inverses of their respective covariance matrices of the regression coefficients. The covariance matrix for the posterior regression coefficients is estimated according to

$$V'^2 = (A_1 + A_2)^{-1} \qquad (12)$$

An Illustration

Assume that the data collected for the prior and current samples are represented by the following matrices:

$$Y_1 = \begin{bmatrix} 6 \\ 4 \\ 5 \\ 2 \end{bmatrix}, \quad X_1 = \begin{bmatrix} 1 & 2 \\ 1 & 3 \\ 1 & 2 \\ 1 & 1 \end{bmatrix}, \quad n_1 = 4,\ k_1 = 2$$

$$Y_2 = \begin{bmatrix} 5 \\ 4 \\ 4 \\ 5 \end{bmatrix}, \quad X_2 = \begin{bmatrix} 1 & 2 \\ 1 & 2 \\ 1 & 2 \\ 1 & 4 \end{bmatrix}, \quad n_2 = 4,\ k_2 = 2$$

If we assume that $\sigma_1{}^2$ and $\sigma_2{}^2$ are both known and equal, then according to (5) the vector of regression coefficients is estimated as follows:

$$B' = \left[\begin{bmatrix} 1111 \\ 2321 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 1 & 3 \\ 1 & 2 \\ 1 & 1 \end{bmatrix} + \begin{bmatrix} 1111 \\ 2224 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 1 & 2 \\ 1 & 2 \\ 1 & 4 \end{bmatrix} \right]^{-1} \left[\begin{bmatrix} 1111 \\ 2321 \end{bmatrix} \begin{bmatrix} 6 \\ 4 \\ 5 \\ 2 \end{bmatrix} + \begin{bmatrix} 1111 \\ 2224 \end{bmatrix} \begin{bmatrix} 5 \\ 4 \\ 4 \\ 5 \end{bmatrix} \right]$$

$$B' = \begin{bmatrix} \frac{23}{22} & \frac{-9}{22} \\ \frac{-9}{22} & \frac{4}{22} \end{bmatrix} \begin{bmatrix} 35 \\ 82 \end{bmatrix} = \begin{bmatrix} 3.05 \\ 0.59 \end{bmatrix}$$

The posterior variance has the value

$$s'^2 = \frac{2(3.38) + 2\,(.33)}{4} = 1.94$$

and the covariance matrix is

$$V'^2 = 1.94 \begin{bmatrix} 8 & 18 \\ 18 & 46 \end{bmatrix} = \begin{bmatrix} 2.03 & -0.79 \\ -0.79 & 0.35 \end{bmatrix}$$

Conversely, if σ_1^2 and σ_2^2 are assumed known but unequal, then the vector of regression coefficients is estimated to (9) yielding the following values:

$$B' = \begin{bmatrix} 13.183 & 32.364 \\ 32.364 & 89.316 \end{bmatrix}^{-1} \begin{bmatrix} 58.962 \\ 148.455 \end{bmatrix} = \begin{bmatrix} 3.551 \\ 0.376 \end{bmatrix}$$

where
$$A_1 = \frac{1}{3.375} \begin{bmatrix} 4 & 8 \\ 8 & 18 \end{bmatrix} = \begin{bmatrix} 1.185 & 2.370 \\ 2.370 & 5.333 \end{bmatrix}$$

$$A_2 = \frac{1}{.3334} \begin{bmatrix} 4 & 10 \\ 10 & 28 \end{bmatrix} = \begin{bmatrix} 11.998 & 29.994 \\ 29.994 & 83.983 \end{bmatrix}$$

and
$$B_1' = \begin{bmatrix} 4 & 8 \\ 8 & 18 \end{bmatrix}^{-1} \begin{bmatrix} 17 \\ 36 \end{bmatrix} = \begin{bmatrix} 2.25 \\ 1.00 \end{bmatrix}$$

$$B_2' = \begin{bmatrix} 4 & 10 \\ 10 & 28 \end{bmatrix}^{-1} \begin{bmatrix} 18 \\ 46 \end{bmatrix} = \begin{bmatrix} 3.67 \\ 0.33 \end{bmatrix}$$

The posterior variance has the value

$$s'^2 = \frac{2(3.375) + 2(0.3334)}{4} = 1.8542$$

and the covariance matrix is

$$V'^2 = \left[\begin{bmatrix} 1.185 & 2.370 \\ 2.370 & 5.333 \end{bmatrix} + \begin{bmatrix} 11.998 & 29.994 \\ 29.994 & 83.983 \end{bmatrix}\right]^{-1} = \begin{bmatrix} 0.687 & -0.249 \\ -0.249 & 0.101 \end{bmatrix}$$

Estimation Procedures Using *a priori* Information

Now suppose that the source of extraneous prior knowledge is *a priori* rather than statistical in nature. To handle this kind of estimation problem, Theil and Goldberger (1961) have developed a procedure which they refer to as "mixed linear estimation." The mixed procedure allows for several pieces of extraneous *a priori* information to be handled simultaneously. When applying mixed linear estimation, the auditor must first construct an appropriate prior joint distribution for the regression coefficients and associated variance covariance matrix. The chosen prior distribution should be an adequate representation of prior belief regarding the regression parameters in the model.

Generally, *a priori* type prior information concerning regression coefficients can be expressed as inequalities on coefficients, or linear combinations on coefficients. For example, if the auditor believes *a priori* that a particular coefficient value must lie between zero and one, this knowledge may be formulated by setting the prior estimate of the coefficient and its variance at .5 and .0625 respectively. Alternately, the auditor may believe that the sum of two or more coefficients must range between plus and minus one, and would therefore express them as a linear combination. Once the prior distributions are established, the auditor would then apply the above procedure thereby generating a post distribution which integrates the subjective initial belief about the model parameters with the available sampling information.

The narrower the range of values over which the coefficient may lie, the more useful is the injection of prior knowledge into the parameter estimation process. In the extreme case, where the interval is zero, the *a priori* information is exacting and may therefore be used to eliminate part of the coefficient vector to be estimated. Conversely, as the interval widens, the *a priori* information plays a smaller and smaller role until its impact is virtually unnoticed. At this point, incorporating *a priori* subjectivity into the analysis makes no noticeable improvement in the regression results.

In Summary

A decision theoretic approach can provide the auditor with regression results which are broader based than the classical approach. Integrating statistical or subjective *a priori* type prior information into the analysis should provide closer estimates of audit population values.

The auditor should be aware that Bayesian regression requires appropriate prior joint distributions for the regression parameters and the error variances. If *a priori* knowledge is used, then the chosen prior distributions should adequately represent the aufitor's initial subjective belief. The resulting post distributions mathematically integrate the initial belief with the available sampling information.

The auditor's decision making process is influenced both by evidence gathered during the course of audit investigation and by the potential impact that decisions may have upon readers of published financial statements. Analytical review procedures provide evidence regarding the reasonableness of reported account balances. The closer the audit estimates are to reality, the more realistic and accurate the resulting auditor decisions can be.

If the auditor's goal is to provide the reader with the most reasonable approximation of true economic reality, then there should be employment of those audit procedures which would yield a more exacting portrayal of the client's economic position and progress. By incorporating prior knowledge into the statistical estimation process, the Bayesian approach should provide the auditor with better evidence on which to base decisions. The extension of Bayes' rule to regression applications in analytical review should provide better indicators of account balance reasonableness. If properly applied, the results should decrease the gap between reported and true values and thereby lessen the potential negative impact on users. Ω

FOOTNOTES

[1]Kenneth W. Stringer, "A Statistical Technique for Analytical Review," *Studies on Statistical Methodology in Auditing, 1975*, supplement to the *Journal of Accounting Research* (1975): 4.

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Accountants as Risk Takers

Avoiding Danger, Or Rising To Challenge

By J.W. Martin

Few economic decisions are made under conditions of complete knowledge. The lack of knowledge creates risk and uncertainty. Irving Fisher, in *The Theory of Interest,* states that risk varies inversely with knowledge. Thus, risk and uncertainty are important factors in the decision-making process. In today's accounting environment, these factors would seem to be important when considered with other external and internal conditions. Externally, accounting activities are subject to review by government regulatory agencies, with the possibility of intervention and penalties if the accountant's actions are deemed improper or inappropriate. In addition, the independent accountant risks lawsuits from a number of third parties. Within the accounting firm itself an individual's performance is constantly being evaluated by superiors. The accountant must meet certain standards, yet work conditions create varying degrees of limitations on such performance. As the number of professional standards increase along with professional liability and government supervision, risks and uncertainties of practice tend to rise. In an environment where decisions are made under such conditions, theories of risk taking deserve careful analysis. An increased understanding of accountants' risk aversion behavior may aid our attempts to explain practitioners' actions or perhaps even anticipate them in given situations.

Research Objectives and Scope

The objectives of this research are twofold: first to set forth the primary personality theories of risk taking which have been developed by psychologists, and second, to discuss possible implications which these theories may have for accountants. Too often research in other fields, such as psychology, is ignored by accountants. This presentation will highlight the results of risk-taking research and expose them to consideration by the accounting sector. The discussion will be limited to personality determinants of risk taking, as opposed to situational determinants.

The Nature of Risk and Uncertainty

To set the background for the discussion it may be useful to contrast economic and psychological definitions of risk and uncertainty. From an economic standpoint, risk denotes a situation characterized by incomplete predictability of alternative events. That is, a situation may be characterized by partial but incomplete knowledge of the parameters of a probability distribution of a set of alternative events. In contrast, the economist views uncertainty as a complete lack of knowledge concerning the parameters of a probability distribution of a set of alternative events (Dictionary, 1969).

While the economist differentiates between risk and uncertainty on the basis of the presence or absence of knowledge, the psychologist differentiates the two terms by applying objectivity/subjectivity criteria. The psychologist views risk as the chance of incurring a loss of some kind. The nature of this loss may be physical, psychological, military, political, economic, or whatever; but something of value may be lost. Risk is objective in that it is external to the individual. It exists regardless of whether the individual is aware of it.

Whereas the psychologist views risk as a characteristic of the environment, he perceives uncertainty as a state of mind. Thus, uncertainty is a subjective phenomenon. Uncertainty may be cognitive or affective. Affective uncertainty involves a state of doubt and indecisiveness. Cognitive uncertainty involves the unpredictability of the outcomes of particular actions, but it is not necessarily stressful nor does it necessarily give rise to affective uncertainty. Here, the psychological view conflicts with the economic assumption that men seek to avoid situations characterized by unpredictability. Psychologists point out that an individual may welcome a cognitively uncertain situation as a challenge.

Personality Theories of Risk Taking

The relationship between risk-taking behavior and personality variables has been the object of considerable research by psychologists in recent years. Various theories as to "who takes risk" have been proposed, but the following four constructs appear to be most highly regarded among psychologists: Atkinson's achievement motivation

Risk-averse seniors may pad the audit budget.

model, Kogan and Wallach's theory of motivation and cognition, Liverant and Scodel's perceived environmental control theory, and Steiner's arousal theory of risk taking. These theories will not be presented in turn.

Atkinson's Achievement Motivation Theory

Atkinson's theory of achievement motivation is not specifically intended to explain risk-taking behavior; however, a risk-taking construct is incorporated within the conceptual framework. The construct asserts that individuals are aware that their performance in given tasks will be evaluated according to certain success criteria. Supposedly, this evaluation creates a desire to perform well, thus the situation becomes achievement-oriented in nature.

Depending on the reactions to these achievement-oriented situations, individuals are placed into one of two possible categories: (1) persons who are high in the need to achieve success and (2) those who are high in the need to avoid failure. The former group seeks out tasks in which there are performance standards to compete against, while the latter group tries to avoid these situations because they are afraid of failing. The theory states that individuals in whom the motive to succeed is greater than the motive to avoid failure prefer tasks with intermediate probabilities of success. In contrast, persons dominated by the motive to avoid failure prefer tasks in which the probabilities for success are either very high or very low (Atkinson, 1964).

Why do success motivated individuals prefer tasks with intermediate probabilities of success? They are not satisfied by taking small risks since accomplishing an easy task does not satisfy the achievement motive. Nor are they satisfied by taking a large risk because chance will usually thwart the achievement motive here. Instead, they prefer intermediate probabilities because this is the area where significant achievements are reasonably possible. In contrast, the individuals who strive to avoid failure prefer greater certainty of knowing that they will either likely succeed or probably fail, depending on their choice of high or low probabilities. But failing to accomplish a low probability task is not really failure, since no one really expected them to achieve such a difficult task (Atkinson, 1964). Thus, Atkinson relates risk taking to the need for achievement and risk aversion to the need to avoid failure.

Several research studies provide empirical support for Atkinson's theory. McClelland found that the tendency to prefer moderate rather than extreme risks in game situations was significantly related to scores on a graphic measure of n Achievement (McClelland, 1958). Atkinson and Litwin found that preference for intermediate level risk was related to high n Achievement scores on the French Test of Insight and preference for extreme risks was related to high scores on a Test Anxiety questionnaire (Atkinson and Litwin, 1960). Other tests confirming Atkinson's theory have been performed by Litwin, Meyer and Walker (1961).

Implications of the Theory for Accountants

Atkinson's theory concerning motivational determinants (success/failure) of risk-taking behavior has important implications for public accounting. Accountants who are motivated to take risks due to a desire to be successful should respond differently than accountants who are motivated to avoid risk by their need to avoid failure. To illustrate, an important task in planning an audit is preparing the time budget. When seniors prepare the budget, they are aware that they will be evaluated on the efficiency in which the audit is conducted, and the budget sets up standards against which performance can be measured. Risk-averse seniors who are intent on avoiding failure may "pad" the budget to such an extent that there is a high probability of meeting the budget. In contrast, seniors who are achievement motivated may establish a moderately "tight" budget in which performance standards are high, yet realistic. They realize that there is perhaps only a fifty-fifty chance of meeting this budget, but they know it will provide a challenge for their audit team and, if successful, should enhance a favorable progress report from their superiors. As a result of their strong achievement motive, they are willing to take the risk of failing to meet the budget and any unfavorable consequences which may result.

Other implications arise from research which relate employee performance to risk attitudes and their underlying determinants. Atkinson and Litwin found that high need achievers (risk takers) showed greater persistence in working at an achievement related task. Moreover, such individuals are likely to show more efficiency, or a higher level of accomplishment, than persons in whom the motive to avoid failure (risk averters) is stronger than the motive to achieve success (Atkinson and Litwin, 1960). Thus, if Atkinson's theory is valid, auditors who are willing to bear risk may be more proficient at applying auditing standards than those who are risk averters.

There is also evidence that risk averters tend to be unrealistic in their vocational choice with respect to both ability and interest. Research shows that they avoid consideration of achievement-related information. Thus, risk averters may lack relevant information concerning the kinds of satisfaction to be found in various occupations. They are prone to choose jobs only remotely related to the kinds of gratifications that they desire and expect to find in their vocations (Mahone, 1960). Thus, it appears that Atkinson's theory has implications, not only for performance but also for job satisfaction, both of which are prerequisites for success in public accounting.

Finally, if accountants are to adequately serve the business needs of tomorrow, innovative individuals who are willing to take calculated risks will be needed. In a rapidly changing environment, successful accountants must be willing to take certain risks. This does not imply that they should take risks which are so great as to bring almost certain disaster; nor does it mean that they should assume risks which are so conservative that their endeavors are limited and the growth of the accounting profession is inhibited. But in certain situations, accountants should be willing to assume responsibilities which involve both moderate risks and moderate rewards.

Kogan and Wallach's Theory of Motivation and Cognition

While Atkinson dwelled solely on motivational determinants of risk, Kogan and Wallach both expanded the motivational determinants being considered and distinguished between motivationally and cognitively determined risk taking. They focused on two motivational determinants: text anxiety (Atkinson's fear of failure motive) and defensiveness (a trait which causes one to project and protect a particular image; for example, males might seek to maintain a bold, risk-taking image). Motivational risk takers are defined as those who are high scorers in test anxiety and defensiveness. Test anxious and defensive subjects are characterized by a "risk conservative syndrone." That is, their behavior is overinfluenced by motivational requirements, such as defending one's self image or avoiding failure, and under-influenced by situational aspects of a task. In contrast, cognitive risk takers score low in test anxiety and defensiveness. Instead of allowing motivational determinants to dictate the decision, they carefully evaluate situational cues which are relevant to successful performance (Kogan and Wallach, 1964).

Neither cognitive nor motivational risk takers are necessarily risk prone or risk averse. The difference between them lies in the consistency with which their risk-taking strategy is employed. Motivationally determined risk takers are either consistently risky or consistently conservative. Their concern with anticipated evaluation causes them to ignore whether or not a task requires skill or merely luck. Their defensiveness causes them to ignore the effects which different risk-taking strategies may have on particular tasks. In contrast, cognitive risk takers do not exhibit a consistent risk-taking orientation across various tasks. They examine the particular situation and choose the decision strategy whose expected success is greatest (Alker, 1969).

When faced with failure, motivational risk takers react by taking a defensive position and insisting on their satisfaction with that strategy. However, cognitive risk takers will express dissatisfaction with the outcome and change the risk-taking strategy to improve their results. Thus, Alker equates motivational risk taking to irrational risk taking and refers to cognitive risk taking as rational risk taking.

Alker contends that risk-taking behavior can be explained by the Kogan-Wallach theory without recourse to Atkinson's theory of achievement motivation. He argues that, while a strong desire to succeed may cause individuals to try hard, this does not guarantee that they will possess the capability of learning from their mistakes, a capability which characterizes cognitive risk takers. Thus, he believes that some subjects may be high on need achievement, and yet follow irrational, rigid risk strategies (either consistently conservative or risky). Rather than appraise one's risk-taking behavior along motivational lines, he would use a rationality criteria: the ability to appraise the properties of particular tasks and to evaluate and correct prior errors.

However, rather than casting the Atkinson theory aside, he cautions the reader with this statement (Alker, 1969, p. 211):

No claim is being made that the Kogan-Wallach formulation should supplant the one with which it is being compared. The Atkinson-McClelland perspective has received far more extensive documentation than the former approach. When two theories lead to the same predictions, the confirmation of those predictions merely circumscribe the domain over which either theory can claim that it is the best available explanation. If both theories are confirmed, possibly the most useful contribution that would be made by a comparison is its estimate of whether one explanation accounts independently for more variance in the dependent variable than does the other.

The CPA should evaluate the audit environment on each engagement to determine the inherent risk.

Implications of the Theory for CPAs

Kogan and Wallach's theory has relevance for all decision-makers since almost every decision of major consequence involves risk. If decision-makers view risk irrationally, then their decision may be irrational. The rational approach to risk problems is to evaluate the merits of the particular situation and then establish a risk strategy. The irrational approach is to allow inner motivations to dictate one's risk preference while ignoring the cost-reward aspects of the situation. Auditors, in particular, should evaluate the risk inherent in each audit situation. For example, the CPA should evaluate the audit environment on each engagement to determine the risk inherent therein. This might include consideration of questions of independence, client disputes with prior auditors, reliance on other auditors, and tight restrictions on completion dates.

Special consideration should also be given to each client's management and business environment. Does management appear to stress the appearance of financial performance or is emphasis placed on real operating performance? Is the client willing to accept unusually high risks, such as with credit policies? Does the client operate in a high-risk industry? Does management face unusual liquidity problems or deteriorating operations? These are some of the factors which will determine the amount of risk inherent in individual engagements.

Evidence that some auditors are giving individual attention to the

Accounting assignments do not challenge all new staff members equally.

risks underlying each engagement exists in the form of audit risk questionnaires. These questionnaries provide a checklist of key risk factors that should be evaluated before the audit program is prepared. Only after considering the peculiarities of each situation can the auditor rationally establish his own risk strategy. This writer suspects that too many auditors allow their inner motivations of conservatism to dictate their audit approach. This could result in overauditing, or what Kogan and Wallach would deem to be irrational risk taking.

Liverant and Scodel's Theory of Internal and External Control

Liverant and Scodel base their theory on Rotter's social learning theory. Rotter (1966) states his general concept of internal and external control as follows:

When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically perceived as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted this way by an individual, we have labeled this a belief in external control. If the person perceives that the event is contingent upon his own behavior, or his own relatively permanent characteristics we have termed this a belief in internal control.

Liverant and Scodel hypothesized that this internal-external control dimension would affect decision making in a risk situation. A decision will be approached differently according to the extent one believes that the outcome depends upon his own behavior. The internally controlled individuals attempt to maintain control in chance-dominated situations by making a cautious and planned selection of probabilities. In contrast, externally controlled individuals will base their decisions on hunches or prior outcomes (Liverant and Scodel, 1970).

In a gambling situation, Liverant and Scodel found that internally controlled subjects chose significantly more intermediate probability bets than externally controlled subjects and that significantly more "internals" than "externals" never selected an extreme high or low probability bet. Finally, their test results indicate that the amount of money wagered on safe as against risky bets was significantly greater for "internals", and the "internals" tended to be less variable in their choice of alternatives.

In essence, the two types seem to differ according to a belief in luck versus a belief in one's own ability to control events. Test results indicate that the "internals", who do not believe in luck, tend to select more intermediate probability bets; whereas, the chance-oriented "externals" select more longshots. These results support the internal-external control theory. Internals desire to have control of their own fate and thus prefer high probability bets which are almost certain to bring success. Externals choose lower probability bets because they believe their fate is not in their own hands.

Implications of the Theory for CPAs

Rotter and Mulry (1965) discuss the behavioral implications of the internal-external control theory as follows:

The perception of a situation as controlled by chance, luck, or fate will lead to predictable differences in behavior, in comparison to situations where a person feels that reinforcement is controlled by his own behavior. The individual who tends to perceive reinforcements as contingent upon his own behavior is more likely to take social action to better his life conditions, is more likely to attend to, and to learn and remember information that will affect his future goals, and is generally more concerned with his ability, particularly his failures. The individual who seems to be more internal also appears to have a greater need for independence and is resistive to subtle attempts at influence.

The implication is that "internals" are more attentive to feedback than "externals". This parallels the writings of DuCette and Wolk (1972) who conclude that externals fail to develop perception of their skills and also fail to develop critical skills themselves. Their views are expressed as follows:

By systematically eliminating feedback from the environment, such a person is, in essence, demonstrating a tendency to avoid situations where he can ever change his behavior. An external subject, by his choice of extreme options, is guaranteeing the fact that he will receive extremely impoverished and biased feedback about himself.

Auditors generally receive progress reports from their superior after each job is completed. In essence, they receive feedback concerning their performance on that particular job. If the progress review is to be successful, the auditor must "attend to and learn" from the superior's suggestions. To ignore assessing one's weaknesses is to invite disaster. Future success is dependent on adequately assessing one's performance on the basis of feedback. Thus, auditors who are "externals" (extreme risk takers as classified by Liverant) may disregard feedback which is essential to their success.

Steiner's Arousal Theory

Steiner's theory is based upon research which suggests that intermediate levels of arousal (a measure of responsiveness) result in better task performance than either very high or very low levels. These studies reflect an inverted U-shaped relationship in which increases in arousal are associated with improved performance up to a point, after which additional increases lead to increasingly inferior performance (Steiner, Jarvis and Parrish, 1970).

Hebb analyzed this relationship and hypothesized that insufficient arousal would result in boredom, and if prolonged, would create a desire for stimulation and a wish to escape from the situation. On the other hand, excessive arousal results in a disruption of normal behavior and a similar desire to

TABLE 1

COMPARISON OF RISK-TAKING THEORIES

Theory	Synopsis	Motivation Factor	Definition of Key Terms	Implications	Tests	Weaknesses
Atkinson	Risk taking is related to the need for achievement and risk aversion to the need to avoid failure. Risk takers will select tasks with intermediate probabilities of success; risk averters select tasks with either extremely low or high probabilities of success.	n achievement	n achievement; a psychological need to be successful in competitive and creative enterprises.	Task selection. Persistence and efficiency. Job satisfaction	McClelland Atkinson and Litwin Atkinson, Bastian, Earl, and Litwin Litwin	May be weak in predicting behavior. Conflicting evidence exists as to what type of task will arouse the achievement motive.
Kogan and Wallach	Risk taking is influenced by motivating and cognitive factors. Motivational factors may lead to rigid, irrational risk decisions. Cognitive factors lead to a flexible and rational approach to risk. The cognitive risk taker learns from his mistakes and revises his risk strategy; whereas the motivational risk taker is consistent in his approach to risk.	Test anxiety and defensiveness. Various cognitive factors	Test anxiety; fear of failure Defensiveness: a desire to protect a particular self-image.	Task selection. Rationality of decision process	Kogan and Wallach	Kogan and Wallach asserted that the defensive subjects may either be consistently conservative or consistently risky.
Liverant and Scodel	Individuals react to risk according to one's belief in his own ability to control events. One who believes he can influence events tries to maintain control in risk situations by choosing tasks with intermediate probabilities of success; whereas he that believes fate controls events may choose tasks with low probabilities of success.	Perceived degree of control	Internal control: belief in ability to control one's fate. External control: a passive acceptance of the environment.	Desire to learn and improve. Desire to work independently	Liverant and Scodel	
Steiner	One reacts to risk according to his state of arousal. Since risk can alter arousal levels, one may seek out or shun risk depending on his present arousal level. If one is already highly aroused, he may avoid risks, but if his arousal state is low, he may adopt risky strategics.	Arousal level	Arousal: a measure of responsiveness which can range from deep sleep or coma to intense excitement or even terror.	Employee training methods	Steiner et al.	Steiner's own experiments show mixed results.

escape. Thus, when the level of arousal is below optimum Hebb suggests that an individual "should approach, and take pleasure in, any circumstances which will increase arousal." In contrast, when arousal exceeds an optimal level, a person "should withdraw in displeasure from the situation" if possible (Steiner et al, 1970).

Steiner relates the arousal hypothesis of Hebb to risk-taking behavior by assuming that risk situations give rise to high arousal levels. They suggest that individuals can influence these levels of arousal and bring them toward an optimum by either avoiding or seeking out risks. They further assert that the extent to which people are willing to bear risk depends upon their current level of arousal. If they are experiencing high arousal levels, subjects will tend to avoid risk and adopt cautious strategies which will bring down their arousal level toward an optimum. Conversely, if they are experiencing low levels of arousal, they will tend to accept risks and thus increase their arousal level toward the optimum.

Implications of the Theory

In essence, Steiner implies that there is some optimal arousal level at which individuals are willing to accept risks. At this level, they attain optimal task performance and avoid boredom. If Steiner is correct, accounting firms should pay particular attention to the degree to which employees are challenged by job assignments.

Consider the manner in which new recruits are typically handled. The audit senior usually gives the new employee relatively easy assignments, such as tasks which are rather mechanical in nature. Moreover, the junior is often assigned to audit accounts of lesser importance and to accounts which have been found to be relatively "clean" in prior audits. This approach supposedly gives the inexperienced employee an opportunity to become acclimated to the audit environment before confronting tasks of a more demanding nature. This approach may be appropriate for the average recruitee; however, juniors that are considered to be in the "cream of the crop" category become bored and dissatisfied when given less challenging assignments.

A better approach could be to differentiate among new employees on the basis of their preemployment records. Burton has suggested that recruits should be divided into one of three groups: audit staff potential, partner potential, and managing partner potential. Those with audit staff potential would go through the normal audit staff training approach. The activities of those with partner potential would be scheduled so that a significant proportion of their time in their recent years is allocated for personal growth. They would not be evaluated on how much auditing work they completed, but instead, a conscious effort would be made to develop them into "question askers," both within the firm and within the client's office. This would be accomplished through outside projects and special educational efforts. Finally, those with managing partner potential would start at the top as administrative assistant to a partner (Burton, 1971). While Burton's proposal may seem radical, a differentiation approach may be necessary in order for each individual to attain an optimal arousal level which, according to Steiner, leads to optimal risk taking and task performance.

For purposes of summary and comparison, the reader should refer to Table 1 which highlights the above theories. It should be emphasized that all of the theories have received mixed test results. This fact must be kept in mind when considering the implications for auditing. One purpose of this research is to bring the theories to the attention of accountants, for if one or more of the theories are valid, then their implications should be noted. Ω

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As this article is written, President Reagan has yet to sign the Economic Recovery Tax Act of 1981, recently passed by both houses of Congress. While it is clear that the legislation will be signed, it is unclear what the full impact of various last minute amendments will be. This article, the first in a series, will discuss the impact of the law on individual taxpayers.

Tax

Rx For Economic Recovery

The 1981 Tax Bill

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1981 Changes

Only a few of the vast changes in the tax law will affect individual taxpayers in 1981. These changes include the areas of rate reduction, sales of personal residences, tax straddles, capital gains, adoption expenses and stock options. The rate reduction has been accomplished by providing a credit equal to 1.25% of the 1981 income tax under the old tables. Withholding schedules will be reduced by 5% as of October 1, 1981, to provide wage earners the benefit of this credit. Under a somewhat complicated computation, the law provides that capital gains occurring after June 9, 1981, will be subject to a maximum rate of 20%. No adjustment was made up to the §1202 exclusion, which remains 40%, nor to the holding period, which remains one year. The Act extends the permissible rollover period with respect to sales of principal residences from 18 months to two years, and raises the "over-55" one-time exclusion to $125,000. Both provisions apply to sales made after July 20, 1981, and rollover periods which have not expired by that date.

In the area of stock options, the new law reestablishes preferential treatment for employee stock options, now called incentive stock options. If the options are granted under a plan which meets the new requirements, there is no taxable event (including no tax preference) on the grant or exercise, and the stock need only be held for one year to qualify for capital gain treatment. The combined holding period for the option and the stock must be at least two years. If the stock is disposed of within the two-year period, the transaction will generally be treated in the same manner as the pre-'76 qualified options, i.e., the "spread" at exercise will be treated as ordinary income, and the employer will get a compensation deduction for the same amount. Unlike prior law, if the stock is sold for less than its value on the date of exercise, no capital loss is recognized; the ordinary income (as well as the employer deduction) is limited to the difference between basis and sales price. These rules generally apply to options exercised after January 1, 1981, but may apply earlier in certain circumstances. The law also includes complex rules which change substantially the taxation of commodity-related transactions, including regulated futures contracts, straddles and hedges. These rules generally apply to all "positions" after June 23, 1981.

Finally, the law grants relief for certain expenses involved in the adoption of designated hard-to-place children with special needs.

1982 Changes

The changes for individuals that begin to take effect in 1982 can generally be classified into three groups: changes in tax rates for income and estate taxes, changes affecting savings and retirement planning, and "all other". The best known provision of the Act creates new income tax rate schedules for 1982, 1983 and 1984. The schedules, *in general,* result in cumulative reductions of 10%, 19% and 23%, respectively. For taxpayers with substantial incomes comprised primarily of personal service income, the actual reductions realized will be lower because of the benefits previously enjoyed from the "maxi-tax". In 1982, the top rate of tax will be reduced from 70% to 50%, which will provide savings significantly greater than 10% for taxpayers with income in excess of $100,000. The final adjustment to income tax rates takes the form of a deducation for two-earner married couples, an attempt to mitigate the problems caused by the different rate schedules for single and married persons. In 1982, a couple is permitted to deduct 5% of the lower-earning spouse's net earned income (reflecting reduction for any expenses deducted in arriving at adjusted gross income which are employment related). For 1983 and thereafter, the deduction rises to 10%.

The estate and gift tax changes take several forms. Beginning in 1982, donors can make gifts, free of gift tax, of up to $10,000 per year per donee ($20,000, if spouse consents). In addition, amounts paid for medical expenses or tuition are not treated as taxable gifts. Also, beginning in 1982, the unified credit will be increased annually until 1987 when it will have the impact of exempting from taxation estates of less than $600,000. Simultaneously, there will be a reduction in the tax rate applied to estates in excess of $2,500,000. By 1985, when the rate reduction is fully implemented, the highest estate tax bracket will be 50% and will apply to estates in excess of $2,500,000. The other significant amendments to the estate tax area include eliminating the provision which had taxed gifts made within 3 years of death, except when the gift involves life insurance; and providing for an unlimited marital deduction. The change in the marital deduction, more than any other amendment in this area, requires practitioners involved in estate planning to review and possibly revise existing estate disposition plans.

In the savings and retirement areas, Congress has made a number of changes. The new "all-savers" certificate will provide an exclusion of up to $1,000 ($2,000 on a joint return) of income generated from certain specified certificates of deposit. There are restrictions against borrowing funds to invest in these certificates. This investment may not be as advisable as other forms of investment for taxpayers whose tax bracket is not high enough to compensate for the less-than-market rate of interest being paid. The Act also repeals the $200/$400 exclusion for interest and dividends for 1981. The public utilities also received favorable treatment under the new law for their dividend reinvestment plans. Beginning in 1982, stockholders may elect to defer up to $750 ($1,500 on a joint return) of dividend income where the dividend is received in additional shares. To the extent this election is made, the shares will have a zero tax basis, converting potentially 50% income to 20% income.

In the retirement income category, Congress has responded to the clamoring of taxpayers for liberalized IRA rules. The limitation on deductible contributions was increased for 1982 from $1,500 to $2,000 ($2,250 with a non-working spouse). Of significance to the part-time worker, this contribution may equal up to 100% of earned income. The rules have also been liberalized to permit divorced persons to make deductible IRA contributions from compensation *and* alimony payments of up to $1,125. The provision most likely to generate interest is the repeal of the active participant rule. Beginning in 1982, even though a worker may be considered to be "covered" by an employer-sponsored retirement plan, a deductible contribution of up to $2,000 may be made to an IRA, employer-sponsored plan or combination thereof. The deductible contributions to an employer plan will be treated similarly to IRA amounts when distributed, and will not benefit from special capital gains or 10-year averaging.

In reviewing the limits on contributions to HR-10 plans, Congress was a little more generous. Beginning in 1982, partners and sole proprietors can now contribute up to $15,000 (limited to 15% of earnings). The previous $100,000 limitation on formula compensation can be increased to $200,000 if a contribution of at least 7.5% of compensation is made for all participants. A contribution can also be made to an IRA, in effect, raising the deductible limit to $17,000. There have been revisions to the TRASOP and ESOP rules, some of which became effective in 1982.

Among the miscellaneous provisions is a relaxation of the onerous tax impact upon the receipt of certain restricted property. The law provides that in 1982 and thereafter, where the gain on a sale of stock would be subject to restoration under SEC "insider" rules or where transferability is restricted as a result of "pooling of interest" rules, the income recognition will be delayed until these "restrictions" lapse. One of the much-talked-about provisions, charitable deductions for non-itemizers, will have little benefit until 1985 when 50% of all charitable contributions can be used to reduce gross income. Prior to that year, only 25% of the amount contributed can be deducted, with the deduction limited to $25 in 1982 and 1983 and $75 in 1984. In 1986, 100% of all contributions can be deducted. The provision expires after 1986.

Also beginning in 1982, U.S. citizens working overseas will be granted a substantial exclusion from taxation for certain income earned abroad. The exclusion in 1982 is $75,000 and increases by $5,000 each year until 1986 when a $95,000 exclusion becomes permanent. An excess housing allowance will also be permitted.

The Act also increases the amount of child care credit and creates a tiered structure. For taxpayers with adjusted gross income in excess of $28,000, the credit is limited to $480 for one child and $960 for two or more.

Delayed Provisions

Some provisions of the new law do not become effective for several years, including "indexing." Beginning in 1985, individual tax brackets as well as personal exemptions and the zero bracket amount will be adjusted based on changes in the Consumer Price Index. Also beginning in 1985, a new net interest exclusion will be available. The exclusion will be 15%, but not more than $450 ($900 on a joint return) of the excess of qualified interest income over qualified interest expense. Qualified interest income includes income from regulated thrift institutions and corporate bonds. Qualified interest expense does not include home mortgage interest.

Our next article will address some of the business provisions, in particular, those affecting capital recovery. The impact of the 1982 changes for individuals makes it incumbent upon all practitioners to review the personal tax planning of their clients so that the least possible tax can be paid over the 1981-1982 period. In particular, taxpayers with substantial amounts of passive income should generally take steps to defer the receipt of that income until 1982.

Education

Recent CPA Exams — A Statistical Note

The ABCs And Ds Of Bias

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In recent years, objective questions of a multiple choice type have made up a significant part of the CPA exam. They have been used in all parts of the examination and have constituted from about one-third to one-half of each section as measured by time allowances.

For example (in objective questions) the May 1980 session Practice — Part I showed 135 minutes out of a minimum allowance of 200 minutes; Theory in the same exam represented 90 minutes out of 150 minutes minimum allowance. In the November 1978 exam Practice — Part II contained 100 of 270 minutes on the maximum allowance and Business Law in that exam devoted 105 minutes of 210 minutes on the maximum allowance to multiple choice. Almost without exception all of the questions in every exam have utilized a four answer choice format.

A basic assumption in objective testing is that no bias will exist towards one of the answer choices or against other choices. In elementary statistics there are several demonstrations that can be made to show that unconscious bias exists in most of us. A question can be posed as to whether the objective questions of the CPA exam have exhibited any bias on the part of the examiners. We should stress strongly that we are not implying bias in any sense of dishonesty. The bias we would be examining would be mainly an unconscious one: e.g., a preference for "c" over "d" for any of a variety of reasons, mostly unknown.

Several statistical tests are available that can determine whether such bias has been present. The customary test to use in such circumstances is known as the Chi-

Square test, and is symbolized as X^2. It is not a difficult test to understand.

If there were no bias present in the construction of the test then as the number of items sampled grew very large we would expect the relative frequency of each of the answer choices to approach one-fourth in the four-choice format. This is a reflection of the basic definition of probability. On the other hand, if the examiner has an unconscious bias towards, for example, the letter "b" then that answer will creep into the examination process more frequently than probability would indicate. It follows though that as "b" is chosen more frequently than it should be, then the relative frequencies of a, c, and d will decline.

The chi-square test does not presume that the actual distribution will come out exactly as expected. Instead it says, in effect, that some variation would be expected by chance but that variation should not be too large. To make the critical decision as to when the variation is too large it is necessary only to compute a value for the variation as described below and compare it to a table of values for the X^2 statistic that has already been worked out.

The arithmetic value for the variation amount is computed by adding together the results of each comparison of, for example a's to be expected a's; b's to b's, etc. Each computation is

$$\frac{(\text{actual minus expected})^2}{\text{expected}}.$$

If we tallied 200 multiple choice responses on a four answer choice then

Actual (what we counted)	Expected (1/4 of 200)	A-E	$(A\text{-}E)^2$ ÷	E =	X^2
55	50	5	25	50	.5
45	50	-5	25	50	.5
58	50	8	64	50	1.28
42	50	-8	64	50	1.28
		Total X^2			3.56

Some explanation of the reasoning for several of the computations is in order. The squaring step is designed to weight negative differences, as well as positive differences. If we expected a value of ten then an actual value of thirteen should carry the same weight as an actual value of seven. In tabular fashion:

Actual	Expected	Actual Minus Expected	(Actual Minus Expected)^2
13	10	+3) not the same	9) the same weight
7	10	-3) as	9) as

In like manner the dividing by expected values is a logical step to compare the variations better. Clearly it is the relative magnitude of the departure from expected rather than the absolute size of the departure. Consider two cases:

	Actual	Expected	Actual minus Expected	(A - E)^2
Case 1.	20	30	-10	100
Case 2.	20	10	10	100

but the Case 2 variation is much more significant since it relates to a much smaller base.

To test for possible bias the five exams from May of 1978 through May of 1980 were analyzed. Every response from each of the five sessions was tallied as to whether it was a, b, c, or d. As we prepare to manipulate the number results comparing expected to actual, a summary of the testing process might be helpful. There are many table values available for a critical X^2. The tables are arranged as (approximate)

Degrees of Freedom \ Significance %	10%	5%	1%
1	2.7	3.8	6.6
2	4.6	6.	9.2
3	6.3	7.8	11.3
4	7.8	9.5	13.3
.			
.			
.			
n			

If the computed result exceeds the table value we assume bias is present, if the computed result is less than the table value then the difference between actual and expected has been small enough to presume that no bias exists. The statistical phrase when we find no bias is "fail to reject the null hypothesis."

The significance percentage is a judgment choice and we will use the traditional 5%. In everyday language this means our decision, by chance, would be wrong only once in twenty tries.

The degrees of freedom value comes from (n-1) in this type of problem. Since there are four classifications (a, b, c, d), degrees of freedom are (4-1) or three. In everyday language degrees of freedom means the number of observations that *can vary* in the problem. If we looked at 200 answer choices spread between a, b, c, d then as soon as we have tallied a, b, and c the d value is fixed. Only three of the four classifications are free to vary hence there are only three degrees of freedom. Our critical X^2 is at the intersection of 5% significance and three degrees of freedom and is 7.8.

The main test was in terms of the aggregate answer distribution from all five exams. In addition some analysis of the individual tests was made. The aggregate distribution is the soundest one to test because the law of large numbers should prevail, given the number of answers under observation.

Given the established significance level we proceeded with the test by utilizing the X^2 statistic and our tally. The results can be summarized as: (not in rigorous statistical language)

Practice I	failed to detect bias
Practice II	a significant bias exists
Auditing	failed to detect bias (but see below)
Law	failed to detect bias
Theory	failed to detect bias (but see below)

Since Practice II was the only section to indicate bias we will detail the test for it premised on the data from the five exams. The five tests included 188 multiple choice items. The computation for X^2 proceeds as

$188 \div 4 = 47$ items expected in each category of A, B, C and D.

The actual tally was:

A	44
B	63
C	50
D	31. The remaining calculations . . .

are: $\frac{(44-47)^2}{47} + \frac{(63-47)^2}{7} + \frac{(50-47)^2}{47} + \frac{(31-47)^2}{47} = \frac{530}{47} \cong 11.3$

This computed value is larger than the critical value for X^2 of 7.8 and indicates that it is unlikely that this variation occurred by chance. The bias is due to disproportional choice of answer B over answer D.

The other four test sections did not reveal any examiner bias but there are several observations that can be made. The Auditing portion of the exams consisted of 300 questions which yields an expected value of 75 for each of the answer categories A, B, C and D. The actual tally was:

A	72
B	75
C	79
D	74

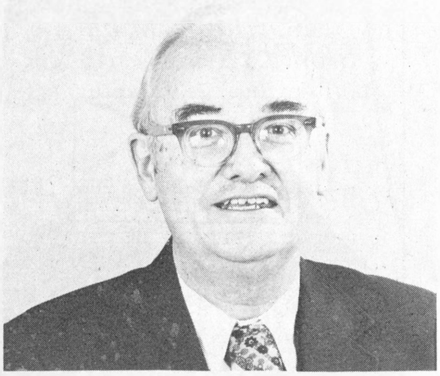
The observation that can be offered is that this section of the exam seems to display a purposeful intent on the part of the examiners to bring results almost exactly in line with expected. Each of the five component exams contained 60 multiple choice questions and even on the individual exams a very tight distribution was found. The lowest and highest individual counts were 11 D's and 19 C's found on the May 1978. All other results were even closer to the expected value of fifteen.

An observation on the Theory portions of the exams would suggest that the May 1980 exam was used to "catch up" on the normality of a distribution that was getting out of hand. It is impossible to make this point statistically but note

	Prior to May 1980	May 1980	Cumulative
A	55	15	70
B	56	8	64
C	52	16	68
D	37	21	58
	200	60	260
	(expected 50)	(expected 15)	(expected 65)

One other interesting anomaly in looking at the individual exam for May 1980 shows that Question 3 in Practice I had 20 multiple choice items without a single "A" answer. This is an exceptional event in terms of its probability. This question was the one devoted to federal income taxation. Under the supposition that this area of questioning could reveal bias it was tested separately, but other than the May 1980 result no significant departure was observed from a normal distribution.

In summary there appeared to be a close relationship of actual distribution to expected distribution in all areas of the exam except Practice II. In fact the Auditing distribution was so close as to suggest purposeful choosing of answers so as to maintain a close relationship. In a light vein, it is suggested that future test takers should, when uncertain on multiple choice questions in Practice II, opt for answer choice "b" in preference to "d."Ω



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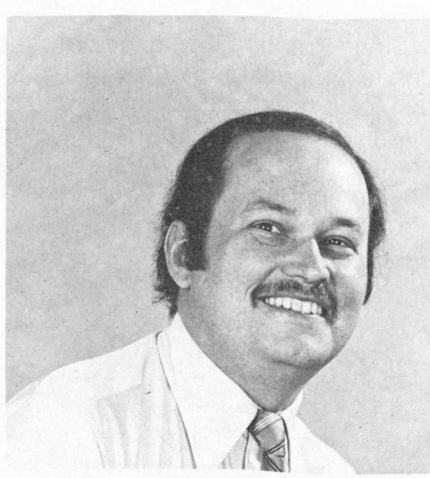

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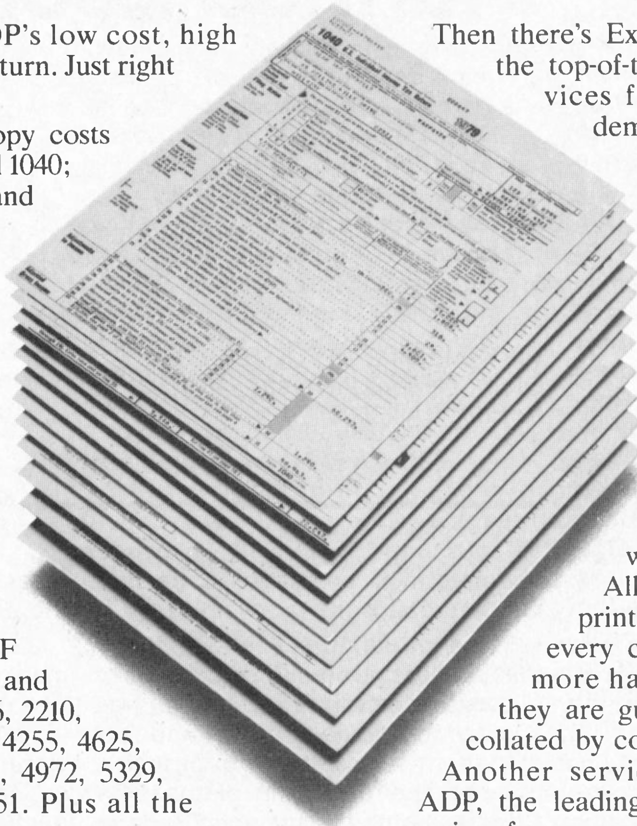

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International Accounting

Prices In A Planned Economy

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EDITOR'S NOTE: This column is not a book review, but a summary. Until this book is published in English, a highly unlikely event, it will remain inaccessible to accountants and economists who speak neither Russian nor German. This column is designed to help them in their research.

Since prices, especially of food items, are the major cause of the developments in Poland, a closer look at the Russian system of price formation should be of interest to everybody in the West. And since prices play a crucial role in the determination of net income, the subject is of special concern to accountants.

To describe the Russian system of price determination this column will summarize a recent book by Professor Dr. Juri W. Jakowez. The Russian title of the book is *Zeny w planowom chosjaistwe;* a German translation under the title *Die Preise in der Planwirtschaft,* published in East Germany (Verlag Die Wirtschaft, Berlin, 1976, 246 p.), is the basis for this column since the author of this column does not speak Russian. All page references are to the German edition. The Engligh translation of the title is *Prices in a Planned Economy*.

A note about the translation from the German of the book into the English of this column is in order first of all. The German book is written in academese, which is similar to bureaucratese, a style noted for unnecessarily long words and sentences, for superfluous repetitions and a generally murky language. In addition, the official literature of socialist counties — and a book about price formation certainly belongs into that category — is written not only to describe and explain its subject, but also to justify and glorify the Communist way as the best of all possible ways. To make this column easier to read and understand, the German version will generally be paraphrased and the propaganda will mainly be eliminated. Whenever it is necessary to be precise or to emphasize a point, an exact translation, identified by quotation marks, will be used.

The book consists of an introduction, a main body of seven chapters, and a summary. This column will follow that format. The titles of the chapters will be used as section headings.

In his introduction Jakowez states that past research in the "science of planned price formation" (p. 15) has focused on a description and explanation of the status quo. In his opinion, the decisions of the 24th Congress of the Communist Party to stabilize the price level and, wherever economically feasible, to lower prices necessitates a new examination of price development. No doubt the worldwide inflation of the past decades and its effect on the socialist economies played a part, too. In any event, Jakowez sees a need for an "exhaustive examination of the nature and factors of price movement in the socialist economy, as well as the development of a scientifically based mechanism for the planned management of price development" (p. 16) and promises to fill that need with his book.

Planned Prices as a Concept in the Socialist Economy

According to Jakowez the planned price is a new concept in economics peculiar to socialist countries. It has two functions: On the one hand it expresses the value of the costs of production, just as it does in other countries; on the other hand it is a tool of socialist planning and a lever in the state's management of the economy.

Jakowez realizes that the development of the economy cannot be planned unless prices, too, are planned. In addition to prices, he writes, the state also uses such other statistics as "the volume of finished production, profits, profitability, costs of production and transportation, the money income of the population, the volume of investments, etc." (p. 21) in planning the socialist economy. He acknowledges that every one of these variables is dependent on prices when he writes, a few pages later, that "prices determine the volume of finished production and of profits, the level of profitability, the real income of the workers, the proportional distribution of the national income as well as the stability of the money supply." (p. 27) What he does not discuss, in this or any other chapter, are the problems caused in the planning process by the interdependencies of the planning and planned variables.

Instead, he discusses the Marxist value concept, i.e. the idea that the labor incorporated in a product determines its value, ending with the prediction that money, prices, and value determinations, will disappear as soon as Communism rules the world. However, he adds, "this will only happen in the distant future; until then it is necessary to study the nature and causes of price formation and price movement." (p. 24)

The second half of the chapter describes the methods used to set prices and pricing policies. The price level, for instance, is determined by the Council of Ministers of the USSR; the prices for the most important industrial goods are set by the central government departments; locally determined prices are coordinated by the price committee of the Council of Ministers.

Of more interest here are some of the remarks relating to accounting. For example, enerprises can sell below planned prices if there is no demand for their products. This action will, understandably, reduce their net income; however, their planned payments to the government — a euphemism for income taxes — are not affected. (p. 34) Executives can lose the bonuses they get for the realization of the firm's net income if their suggestions for industrial or consumer prices deliberately overestimated production costs. And Kosygin himself warned firms at the 24th Party Congress that "all attempts to realize profits by ignoring or increasing planned prices or by disregarding planned product lines or manufacturing standards constitute an action against the interests of the state." (p. 37)

Nature and Trends of Price Movements

Jakowez starts this chapter by referring to the great Soviet price statistician (his description) S. G. Stoljarow who found that prices increase and decrease slowly over long periods of time, but that they seldom, if ever, return to their original levels. Staljarow concludes that prices increase all the time and will continue to do so as long as prices exist. (p. 44) This conclusion causes Jakowez to wonder whether price movements are subject to some economic law which makes inflation inevitable.

To prove or disprove the existence of such an economic law he lists the factors causing reductions in costs and, through them, in prices, such as increases in labor productivity, scientific and technological progress, and specialization. In his opinion these tendencies towards lower prices are sometimes offset by wage increases in excess of increases in labor productivity. As an example he cites higher wages for workers in collective farms which increased costs and wholesale prices for agricultural products in the early 1970s.

Jakowez then describes price movements in the West over the past 200 years. He, like British and American economists before him, finds a steady increase in the price level. He dismisses the wage-price spiral as a cause of inflation because, in his opinion, Marx disproved that theory when he showed that wage demands follow price increases. Jakowez also thinks that, in general, labor productivity in the capitalistic countries increases faster than wages and cites Wygodski as proof. Wygodski, he says, examined wages and prices in the US between 1945 and 1967 and found that labor productivity increased by 98.7 percent, wages increased by 32 percent, prices of industrial goods rose by 89 percent and some monopolistic prices rose by as much as 15 percent. (p. 50)

Jakowez then examines the role of money in Western inflation. He finds that increases in the paper money supply and the abandonment of the gold standard were contributing factors, but he concludes that monopolies and monopolistic pricing policies, not some immutable economic law, are the basic causes of inflation in the West.

He then turns his attention to price movements in the Soviet sphere of influence. He summarizes prices, pricing decisions and the reasons for them from Lenin to the early 1970s and finds here, too, a general upward trend. He lists four reasons for inflation in Russia:

1. Increases in wholesale prices due to increases in wages, decreases in working hours, and increases in costs in the extractive industries caused by the mining of marginal properties;

2. Elimination of losses in some industrial branches to facilitate better planning and economic stimulation and to create the basis necessary for effective accounting systems;

3. Increases in the income of collective and state-owned farms to increase their profitability and their proportionate share of national income; and

4. Increases due to the chain reaction of other increases. (pp. 63-64)

Jakowez remarks that price increases affected mostly wholesale prices and that retail prices remained generally stable, "a considerable achievement of the economic policy of the Party and the state," in his words. (p. 64) He also notes that this policy caused losses to the state on important consumer goods like meat, butter, and potatoes, when wholesale price increases were not offset by corresponding changes in retail prices and these goods were, in effect, sold below cost. Apparently prices were raised for some consumer goods, because Jakowez blames the increases in the prices of meat, butter, potatoes, and vegetables for the decrease in the real income of some people, especially people with fixed incomes, and for the decline in the purchasing power of the ruble.

He concludes that the past increases in the price level in Russia were not due to some general law of economics but caused by "measures necessary to create the prerequisites for higher efficiency of socialist production and lower production costs and the subsequent return to the main direction of the long-term pricing policy of a general, economically founded, lowering of the price level." (p. 64)

For the future Jakowez sees the main purpose of Soviet price planning in maintaining the stability of the price level and in lowering individual prices as seen as economically feasible. (p. 67)

Long-Term Price Planning

In this chapter Jakowez first examines the problem of whether price planning should take place before or after economic plans are drawn up. He concludes that the two are so interwoven that price and economic planning must proceed simultaneously. He then lists the following goals for long-term price planning:

1. to price goods and services to reflect the absolute and relative amount of labor contained in them and to gradually lower the price level;

2. to enhance the role of prices in the acceleration of scientific and *technical progress, in the improvement of product quality, and in the rational usage of resources;*

3. to eliminate the current geographic differences in prices caused by differences in production costs in order to achieve uniform prices for the whole country;

4. to use the price system to spur the development and mechanization of agriculture, to lower production costs and improve the quality of agricultural products, and to narrow the existing income gap between the urban and rural population;

5. to make better use of retail prices in creating a constantly rising standard of living for the people and to lower retail prices gradually as demand is satisfied and production costs decrease;

6. to enlarge the role of prices in integrating the economies of the socialist countries, in determining comparative advantages among countries, and in furthering the effectiveness of foreign trade;

7. to strengthen the unified governmental pricing policy and to increase the effectiveness of the mechanisms for planned price formation. (pp. 82-93)

The remainder of the chapter is taken up with an exploration of the pricing systems in different segments of the economy, such as agriculture, transportation, and consumer goods.

Changes in Production Costs and Their Effect on Prices

Jakowez is aware of the interdependence of costs and prices and realizes that, in the long run, prices must cover reproduction costs. He finds two exceptions to this rule: (1) above normal costs due to specific factors, such as production below capacity by new enterprises or management mistakes, do not have to be covered by prices; and (2) some of the production costs can be covered by state subsidies or a reallocation of profits among firms in the same industry. He cites the example of the coal industry which generally operates at a loss.

He warns, however, against losses becoming a normal state of affairs. This situation "undermines the basis of effective accounting, diminishes the firm's desire to increase production and save resources, and contradicts the principles of the new system of planning and economic stimulation." (p. 122)

In Jakowez' opinion production costs are more effective in influencing wholesale than retail prices. For evidence he cites rising costs in the mining industry being followed by rising prices, and lower costs in synthetics being accompanied by lower prices. He also finds a close association between rising costs and rising wholesale prices for agricultural products. He notes that collectively-owned and state-owned farms must be reimbursed for their rising costs to insure their continued efforts to increase the production and sale of food and other agricultural products to the state.

Since retail prices, according to Jakowez, "fulfill an important social function, they are affected by factors other than changes in production costs, such as the ratio of supply to demand, the social importance of the goods or services, etc. For this reason the retail prices for important food items like meat, animal fats, milk, potatoes remain unchanged, even though the higher wholesale prices have led to a substantial increase in the state's expenses for the purchase, processing, and sale of these goods." (p. 124) Jakowez does not say what the state should do when it cannot absorb these losses any more. The former and the present Polish governments are probably very interested in the solution to that problem.

In a note of interest to accountants Jakowez states that manufacturing costs would play a larger role in setting prices if good cost accounting systems were developed which would determine the total costs and expenses and the method of allocating them over the items produced. (p. 125)

Jakowez then examines the movements of production costs for various industrial sectors and finds a mixed picture. Costs have not decreased fast enough, he thinks, for three reasons: (1) scientific and technical progress was not sufficiently supported and exploited; (2) the rate of growth of labor productivity has slowed down; and (3) rising costs in basic industries have increased costs in other sectors. To sum up Jakowez speculates in a very revealing paragraph:

"Maybe one influence on the changes in production and transporation costs has been that attention has shifted from expenses to profits and profitability in the evaluation of firms and the stimulation of the economy. Profits and profitability depend not only on changes in costs and expenses, but also on other factors, such as changes in prices and in the quality of goods produced, asset turnover, etc." (p. 132)

To end the chapter he lists four methods of lowering costs and expenses which should be emphasized in the next Five-Year Plan. They are:

1. Labor productivity must rise faster than wages. He thinks higher wages are necessary to raise the standard of living, education, and job training of the population. He also thinks the trend towards a shorter work week will continue and approvingly cites Marx who said: "The reduction in working time increases leisure time, i.e. time for the total development of the individual, which is itself the greatest production force and will affect the productive force of labor." (p. 136) (Translator's note: The German version is as murky as the English one.) Jakowez does not mention the political reasons, but then he wrote before the strikes in Poland.

2. Investments in productive assets must be increased. Since depreciation is a cash expense in Russia, i.e. a payment to the state to reimburse it for money advanced to acquire fixed assets, the amount of depreciation is available for investment. According to Jakowez depreciation expense has increased from 9.1 billion rubles in 1960 to 35.3 billion rubles in 1972; the money for investments is therefore available. Depreciation is also a small proportion of total costs and expenses, rising from 3.5 percent in 1960 to 5.4 percent in 1972. Increases in depreciation expense should therefore not have a material effect on total costs and expenses.

3. The usage of direct and indirect materials, like raw materials, supplies, and fuel, per unit of production must be reduced. Since these items constitute about three-fourth of total costs and expenses in manufacturing, small savings here can have important consequences.

4. The need to exploit less ac-

cessible natural resources and to protect the environment must be offset by the development of more sophisticated technology and machinery, especially in the extractive industries.

Profitability and Price Movements

Jakowez starts this chapter by stating that the key problem in setting and changing prices is the determination of standard profits, especially when expressed as rates of profitability. The reasons are:

1. In a socialist economy prices must be determined objectively. To plan prices, standard prices must exist, so that existing prices can be changed in their direction.

2. The most important statistics in planning and stimulating the economy are sales, the amount of net income, and the rate of profitability. These figures are directly dependent on prices.

3. Standard profits must be set before standard prices can be formulated, because standard prices should be based on costs and standard profits and not on estimates.

4. Standard profits are necessary for the planning and prediction of prices. Material differences between actual and standard profitability are signals then to check the price level in that segment or industry.

Jakowez realizes that price planning is nothing but a method of allocating total net income among segments of the economy. He warns, however, against setting one rate of profitability for the whole economy. In his opinion, different rates should be used in different industries and for different product groups to reflect the variety of conditions under which prices were set and changed in the past. But he thinks that the crucial question is: How do profits affect the movement of prices? He devotes the rest of the chapter to examining that question.

In should be pointed out here that profitability in Russian accounting is expressed as a percentage of either total costs and expenses or total productive assets, a balance sheet category similar, but not identical, to fixed assets.

Jakowez first examines trends in profitability for various segments of the economy. A table for the years 1960 through 1972 shows that profitability increased until 1970 in all sectors and then decreased in most of them. Jakowez attributes this fact less to reductions in costs and expenses and increases in labor productivity, but more to increases in industrial and wholesale prices before 1970. The table also shows differences in profitability with rates of return on productive assets ranging from 6.3 percent for state-owned farms to 19.3 percent for manufacturing, with collective farms (10.4 percent) and transportation (15.2 percent) in between. (p. 146)

When standard profits are established for the various sectors of the economy, Jakowez advocates that the following circumstances be considered:

1. The size of profits in different sectors reflects to a certain extent the value added by that sector;

2. Lower rates of return on productive assets are probable in the future due to higher investments in such assets and due to the upward revaluation of basic assets (an amount somewhat comparable to total equity) by 73 billion rubles on January 1, 1972; and

3. Higher efficiency of production should result in higher total profits which should be used for the periodic reduction of the price level for goods and services.

He concludes that differences in standard profits are appropriate for different sectors of the economy. He then examines profits within the segments of some economic sectors and arrives at the same conclusion after discussing various models for price formation.

One such model is what is known in the Soviet economic literature as the "two-channel price." This discussion throws some interesting light on the distribution of profits. The price is so named because profits are diverted into two channels: the production fund which depends apparently on the value of the productive assets, and the wages fund which seems to be based on total wages paid. The production fund is used, for instance, for transmissions to the state for the production fund tax, to the fund for production development, to lenders for interest, and into the firm's own circulating fund to increase circulating (i.e. current) assets. The wages fund is used for transmissions of profits to the fund for economic stimulation, to the fund for social and cultural activities, to the fund for residential construction, and to cover losses of municipal and housing industries. In Jakowez' opinion, "the two-channel price reflects the double role of profits in the socialist economy: On the one hand it is a source for the means of increasing production, on the other hand it is used for the economic stimulation of collective enterprises and to finance expenditures for social purposes." (p. 152)

Jakowez sides with economists who suggest a three-channel price with the third channel used for a tax on natural resources consumed and for expenditures to clean up and restore the natural environment. (Since land in Russia is not privately owned, land and natural resources are not shown as productive assets on Russian balance sheets. The costs of the extractive industries therefore consist only of the costs of extraction. The ores and minerals themselves have no cost.)

Another model for formulating prices discussed by Jakowez employes shadow prices. He describes briefly the econometric models used and then dismisses shadow prices because they cannot be substituted for "living" prices containing real values. (p. 160)

Finally he mentions, with disdain, a model in which prices are calculated to provide "internal financing." (Similarities to retained earnings are surely not accidental.) It would require higher prices in those segments in which present profits are insufficient to cover needed investments and would hinder price reductions in very profitable segments. Total internal financing of all segments would, he thinks, mean a decentralization of accumulated funds and a reduction in investments. "One advantage of the socialist planned economy," he states, "consists in the possibility to centralize accumulated funds and to use them in crucial areas. This advantage cannot be sacrificed." (p. 164)

(Concluded in January, 1982 issue)